IDENTIFYING MECHANISMS OF WETLAND INVASION: QUANTIFICATION OF RESOURCE ALLOCATION DIFFERENCES BETWEEN NATIVE AND INTRODUCED *PHRAGMITES AUSTRALIS*

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ABSTRACT

Phragmites australis provides researchers with an excellent model system to investigate plant "invasiveness" because both introduced and native haplotypes can be found in the same geographic region. However, few ecological investigations have compared the native and introduced *P. australis* subspecies, which were only first distinguished in 2002. Despite the wide geographic range of *P. australis* in North America, most research has compared the native and introduced lineages, but has not investigated potential variation at the population level. Genetic variation, the possibility of multiple source populations for the introduced lineage, and the continental-scale colonization of both lineages suggests that populations from different geographic regions may vary significantly in their response to environmental variables. Studies conducted with single populations of native and introduced *Phragmites* may not detect this variability. This common garden study used populations of native and introduced *Phragmites* from four locations - Maryland-Delaware, Rhode Island, Massachusetts, and New York - to compare the relative responses of different subspecies and populations to increased nitrogen and phosphorous. Overall, there was a positive response to nitrogen additions, but the nature of that response varied among populations for aboveground biomass, belowground biomass, inflorescence biomass, and nitrogen standing stock. Belowground nitrogen tissue concentrations increased in both native and introduced populations in response to nitrogen additions, but native *Phragmites* often had significantly higher concentrations. This suggests that the native lineage may be more efficient at nitrogen storage underground. Both native and introduced

Phragmites had a significant increase in phosphorous tissue concentrations and standing stock of phosphorous in response to increased nitrogen and phosphorous as well as a nitrogen and phosphorous interaction indicating that both phosphorous and nitrogen play an important and related role in phosphorous uptake. However, native *Phragmites* frequently had significantly higher phosphorous tissue concentrations while introduced *Phragmites* often had significantly higher phosphorous standing stock. This study found major variation at both the population and subspecies levels in response to additions of N and P. Under some conditions, significant trends were driven by a single pair of native and introduced populations, especially the Maryland/Delaware populations, while other native and introduced pairs did not differ significantly.